

Remarks

Claims 14-18, 21, 25-27 and 30-33 are pending. Claims 19-20, 22-24 and 28-29 have been canceled without prejudice. Support for the amendments to claims 14, 25 and 27 can be found at, for example, paragraphs [0061] and [0073] of the published application, claims 20, 24 and 28 and Examples 6, 8 and 9. No new matter has been added.

**35 U.S.C. § 102**

The Examiner rejected claims 14, 19, 23-25 and 27 under 35 U.S.C. § 102(b) as being anticipated by Yamamura et al. (US 6,287,745). The Examiner also rejected claims 14, 19-21, 23-25 and 27-29 under 35 U.S.C. § 102(e) as being anticipated by Johnson et al. (US 7,232,850). Applicants traverse these rejections for the following reasons.

Yamamura et al. disclose a photocurable liquid resin composition containing (A) a cationically polymerizable organic compound; (B) a cationic photopolymerization initiator; (C) an ethylenically unsaturated monomer; (D) a radical photopolymerization initiator; (E) a polyether polyol having one or more hydroxyl groups and optionally elastomer particles. Yamamura et al. disclose many ethylenically unsaturated monomers. However, Yamamura et al. does not disclose trimethylolpropane ethoxylated triacrylate.

Johnson et al. also discloses a photocurable resin composition containing a cationically curable compound, an acrylate-containing compound, a hydroxyl containing compound, and cationic and free radical photoinitiators. However, Johnson et al. does not disclose propoxylated glycerine.

Therefore, because each and every limitation of independent claims 14, 25 and 27 are not disclosed in the publications cited above, the present set of claims is not

anticipated by these publications. Accordingly, Applicants request the rejections under 35 U.S.C. § 102(b) be withdrawn.

**35 U.S.C. § 103**

The Examiner rejected claims 21, 22 and 29 under 35 U.S.C. § 103(a) as being unpatentable over Yamamura et al. and claims 20 and 28 as being unpatentable over Yamamura et al. and further in view of Lapin et al. (US 6,251,557). Applicants traverse these rejections for the following reasons.

As noted in the present application, many hybrid photocurable compositions (i.e. a composition containing both cationically curable and free radically curable compounds) were known at the time of Applicants invention. However, such known compositions were unsuitable for some applications since they, after curing, produced articles that were “yellow” or opaque. Applicants thus set out to achieve a hybrid photocurable composition which, after curing, produces an article having no visible color, is non-hazy, and additionally has good mechanical properties.

It has been held that a particular parameter must first be recognized as a result-effective variable (i.e. a variable which achieves a recognized result) before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *See MPEP §2144.04 II B.* Applicants submit while Yamamura et al. and Lapin each teach many compounds and broad ranges used in producing a photocurable composition, neither publication, alone or in combination, teach or suggest that the presently claimed compounds at their claimed percentages would provide a composition which, after cure, produces an article having a yellow

index/inch value of less than 80, and is therefore clear and has no visible color, in combination good mechanical properties.

In particular, Yamamura et al. set out to achieve a photocurable composition which, after cure, produced an article having good mechanical strength and high accuracy. As noted above, Yamamura et al.'s photocurable compositions generally contain a cationically curable compound, an ethylenically unsaturated compound, a polyol, photoinitiators, and optionally elastomer particles. Numerous cationically curable compounds are taught to be suitable for use in the photocurable composition at a range of 20-85% wt %, but Yamamura et al. provides no teaching or suggestion that utilizing no more than 5% of a glycidyl epoxy would or could achieve any recognized result. Similarly, Yamamura et al. teach numerous ethylenically unsaturated monomers suitable for use in the photocurable composition at a range of 5-45 wt. %, but again provides no teaching or suggestion that utilizing monomers that do not contain hydroxyl groups would or could achieve any recognized result. Furthermore, as noted above, Yamamura et al. fail to teach or suggest the use of trimethylolpropane ethoxylated triacrylate. Finally, Yamamura et al. teach numerous polyols suitable for use in the photocurable composition at a range of 5-35 wt. %, but provides no teaching or suggestion that utilizing propoxylated glycerine at an amount of 0.01-10 wt. % would or could achieve any recognized result.

Nevertheless, Applicants have surprisingly found that combining the specific components presently claimed at certain amounts produces, upon curing, an article that is not only clear and colorless (i.e. has a yellowness index/inch value of less than 80) but also exhibits excellent mechanical properties. For example, Applicants respectfully

direct the Examiner's attention to Examples 6, 8, 9-12 and 15 and Comparative Example 7 described in Tables 1 and 5 of the present application. By removing hydroxyl-group containing acrylates from the photocurable composition, inventive Examples 6, 8 and 9, after cure, produced clear, colorless articles having a yellow index/inch value of less than 80 and additionally exhibited a high flex modulus, high heat deflection temperature and high water resistance. In comparison, Comparative Example 7, which contained 5 % by wt. of a hydroxyl-group containing acrylate, exhibited more color than the inventive Examples (see Table 4). More surprisingly, Applicants found that when the photocurable composition contained 6% by wt. of a hydroxyl-group containing acrylate, such as in Examples 10-12, the cured articles were either opaque or exhibited even more color (see Table 5). Finally, Applicants surprisingly found that by reducing the amount of propoxylated glycerine from 20% by wt. to 10% by wt., along with eliminating hydroxyl-group containing acrylates from the composition, a colorless cured article was achieved (see Example 15 in Table 5 which contained 20% by wt. of propoxylated glycerine and 3% by wt. of a hydroxyl-group containing acrylate exhibited a yellow index/inch value of 89 and Examples 6, 8 and 9 in Table 3 which contained 10% by wt. of propoxylated glycerine and no hydroxyl-group containing acrylates exhibited a yellow index/inch value of less 80). Yamamura et al. neither teach nor suggest such surprising and unexpected results.

Lapin et al. has been added for the purpose of including trimethylolpropane ethoxylated triacrylate to improve cure speed. However, for the reasons set forth above, Lapin et al. combined with Yamamura et al. does not teach or suggest that the presently claimed components at their presently claimed amounts would or could achieve

Applicants surprising results. Accordingly, Applicants respectfully the rejections be withdrawn.

The Examiner also rejected claim 22 as being obvious over Johnson et al. in view of Yamamura et al.

Johnson et al. is available as prior art under 35 U.S.C. § 102(e) and has been used in a rejection under § 103(a). As evidence to disqualify Johnson et al. from being used in a rejection under 35 U.S.C. § 103(a) against the claims of the present application, the following statement is submitted:

U.S. Pat. App. Ser. No. 10/577,884 and U.S. Pat. No. 7,232,850 were, at the time the invention of U.S. Pat. App. Ser. No. 10/577,884 was made, owned by Huntsman Advanced Materials Americas Inc.

### **Double Patenting**

The Examiner has rejected claims 25, 27 and 29 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2, 6 and 10 of U.S. Pat. No. 7,232,850 in view of Yamamura et al.

For the reasons set forth above, neither Johnson et al. nor Yamamura et al., alone or in combination, make obvious a composition containing the combination of: a cationically curable component containing no more than 5% by wt. of glycidyl epoxy, at least 4% to at most about 20% by wt. of a (meth)acrylate component containing no hydroxyl groups and comprising trimethylolpropane ethoxylated triacrylate, and 0.01-


10% wt of a polyol component comprising propoxylated glycerine which, after cure, produces an article having a yellow index/inch value of less than 80.

In view of the above amendments and remarks, Applicants respectfully submit the claims are in condition for allowance and respectfully request issuance of a Notice of Allowance.

The Commissioner of Patents is hereby authorized to deduct any fee due in connection with the filing of this document from Huntsman Corporation Deposit Account No. 08-3442.

Respectfully Submitted,

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